ATTACHMENT J.1

CONSTRUCTION DOCUMENTS FOR THE DISTRICT OF COLUMBIA, DEPARTMENT OF GENERAL SERVICES TITLED: HISTORIC WOOD WINDOW REPLACEMENT WINDOWS CONSTRUCTION DOCUMENTS, DC FIRE STATION #5, 3412 DENT PLACE NW WASHINGTON DC 20007, MAY 20, 2011 – REVISED APRIL 4, 2012

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Historic Wood Replacement Windows

Construction Documents

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May 20, 2011- Revised April 4, 2012

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SECTION 08500

HISTORIC WOOD WINDOWS GLASS & GLAZING GENERAL REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
1. Scope of Work
2. Project Site Conditions & Allowances
3. Permits, License and Related Approvals
4. Work Schedule
5. Use of Hazardous or Toxic Chemicals
6. Distribution of Windows/Glass & Glazing Through the Building
7. Restoration of Premises
8. Employee Qualifications & Supervision
9. Installation Requirements
10. Procedures for Commencement and Completion of Work

B. Related Sections:

1. Section 08520 Historic Wood Windows [Factory Glazed]

1.02 SCOPE OF WORK

A. Measurement and scheduling of installation of all new glass & glazing, all new wood architectural windows. Preparation of detailed shop drawings for the work in its entirety shall be approved for design and acceptance by the design architect and the FEMS, prior to commencement of fabrication. Shop drawings shall indicate all field condition findings, all special details. **There will be no allowance for overlooked special conditions not shown on shop drawings.** All special details must be marked and identified by ID number or letter on submittals with definition of findings.

B. Furnishing of new materials, storage, distribution, installation, caulking and cleaning of new windows and all necessary installation components authorized by way of approval of submitted shop drawings and product data.

C. Caulking of all new windows, entrances, glass, and associated accessories shall be achieved with the use of Structural Silicone sealants with an application of compatible primers.

D. Performance of the work requires the successful window contractor to indicate a **probable schedule** (in accordance with procedures for commencement and completion of work, section 1.13.

1.03 PROJECT SITE CONDITIONS & ALLOWANCES

A. The FEMS will provide a site for placement of a project dumpster, provided by the window contractor, for the exclusive use of the window contractor in the disposal of ALL

materials from the execution of the contract only. Location shall be shown during a scheduled post award meeting with the Contractor and FEMS.

B. FEMS will provide a site for the placement of a storage trailer, for the sole use of the window contractor to store materials and work from. The FEMS requires that the unloading of all shipments of new windows, glass and components be stored in this trailer for the exclusive use of the window contractor. It will be the window contractors responsibility to notify FEMS, in the proposal whether (1) or (2) trailers will be required Distribution will occur from this storage trailer to the designated areas within the project building.

1.04 PERMITS, LICENSE AND REALTED APPROVALS.

A. The window contractor shall be, at his or her expense, obtain all applicable permits, licenses and code approvals which may be required in the performance of the contracted work contained within Sections 08500 and 08520. Further the window contractor will be responsible to pay all excise, license, occupation and other taxes which may become payable to any authority, including all taxes upon the sale, use, storage, consumption and/or fabrication of the materials, supplies, equipment and other things furnished by the window sub-contractor.

1.05 WORK SCHEDULING

A. The window contractor shall indicate a probable schedule for the overall work on each floor. Acknowledging the requested schedule outlined.

B. The window contractor shall note that:
   a. Work will commence no earlier than 6:30 AM and end no later than 6:00 PM, local time, unless authorized by the COTR.
   b. Work shall not be performed on Saturdays, Sundays or Federal Holidays.
   c. Work shall start and be completed on each and every window opening within each designated, scheduled work area on each day. There can be **NO** openings left incomplete or open overnight.
   d. Work can not commence or continue during threatening weather, such as driving rains, excess winds, snow or temperatures below 32 degrees.
   e. A completion time for the project will be submitted and approved.
   f. Overrun penalties will be specified and enforced if FEMS deems it appropriate to complete this portion of the required contract work.

1.06 USE OF HAZARDOUS OR TOXIC CHEMICALS

A. Use of, toxic and irritating chemicals and substances in the commission of the work shall be avoided to the maximum extent possible. Material safety data sheets (MSDS) shall be provided in the formal submittals to the design architect. Waste materials from the installation shall be handled and removed from the building premises by the window contractor and recycled as provided for in the scope of work.

1.07 DISTRIBUTION OF WINDOWS GLASS & GLAZING THROUGHOUT THE BUILDING

A. The COTR shall specify the stairway to be used for moving the windows, glass and accessories within the building. At **NO** time shall any material be moved within the building except through the designated and authorized Means.

1.08 RESTORATION OF PREMISES

A. The window contractor agrees that at the conclusion of its services hereunder, it will leave the property in clean condition and will remove, from the property any trash, supplies, equipment and the like not necessary to the continued performance of the assigned contract.

B. In the event the window contractor does not perform its clean-up operation to the satisfaction of FEMS, then FEMS may, after 48 hours written notice to the window contractor, perform the clean-up operations and charge the window contractor for the cost thereof, plus 10% and deduct the charge from the payments provided under the contract.

1.09 EMPLOYEE QUALIFICATIONS & SUPERVISION

A. Window contractor shall furnish duly qualified, experienced employees and supervisors to perform the work required in the contract.

B. Window contractor shall appoint a qualified supervisor for the project and provide the contractor with the supervisor's name and an expeditious method of contacting the supervisor. The supervisor shall be capable of adequate supervision of the work at all times to ensure its completion and satisfactory performance in accordance with the terms of the contract.

C. Window contractor shall comply with the instructions pertaining to conduct and building regulations issued by the COTR.

D. Window contractor shall, at all times, enforce strict discipline and maintain good order among the workers and shall require workers to observe all fire prevention, security and safety rules and building regulations in force at the work site.

E. In the performance of the work herein contemplated, the window contractor is an independent contractor with the authority and responsibility to control and direct the performance and the details of the work.

F. The work contemplated herein must meet the approval and shall be subject to general right of inspection by the design architect (construction manager) and FEMS to ensure strict compliance with the terms of the contract.

SECTION 08520
HISTORIC WOOD WINDOWS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
1. Extruded Historic Wood Windows with fixed sash and operating sash.
2. Factory glazing.
3. Operating hardware.
4. Insect screens.

B. Related Sections:
1. Section 08500 Historic Wood Windows, Glass & Glazing General Requirements

1.02 REFERENCES

A. Reference Standards: Comply with following:
1. AAMA/NWWDA 101/I.S.2 - Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors; American Architectural Manufacturers Association; 1997 with revisions contained in "reprinting" of 12/99.
2. AAMA 1503.1 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; American Architectural Manufacturers Association; 1998.
3. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels; 1998.
4. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; American Architectural Manufacturers Association; 1997.
5. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; American Society of Civil Engineers; 1998 (Pub. 2000).
6. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2000.
7. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2000.
8. ASTM E 283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 1991 (Reapproved 1999).
9. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference; 1997.
10. ASTM E 548 - Standard Guide for General Criteria Used for Evaluating Laboratory Competence; 1994.
11. ASTM E 783 - Standard Test Method for Field Measurement of Air Leakage through Installed Exterior Windows and Doors; 1993.
12. ASTM E 987 - Standard Test Methods for Deglazing Force of Fenestration Products; 1988(1994).
13. AAMA 502-08 - Standard Test Method for Field Determination of Air Infiltration and Water Penetration of Installed Exterior Windows and Doors by Uniform Static Air Pressure Difference; 2008.

1.03 SYSTEM DESCRIPTION

A. Design Requirements: Drawings and Specifications establish requirements for aesthetic including dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

B. Performance Requirements: As specified in PART 2, with the following additional requirements:

C. Manufacturers "Certificate of Compliance" must be submitted certifying product meets requirements of AAMA 101.I.S.2-97 and 1503. AAMA Certificate of compliance will be required on all windows.

D. Design and size windows to withstand the following load requirements, when tested in accordance with ASTM E 330.
   1. Design Wind Loads: Comply with requirements of ASCE 7-05.
   2. Minimum Design Pressure: 50 lbs/sq ft.
   3. Structural Test Pressure: 75 lbs/sq ft.

E. Deflection: Not to exceed l/175 of unsupported spans, when tested in accordance with ASTM E 330 using test loads equal to 1.5 times the design wind loads with 10 second duration of maximum load, and must be without permanent deformation of any component, glass breakage or anchorage failure.
   1. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.

F. Movement: Accommodate movement between window and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
   1. Thermal Movement: Design and install sections to permit thermal expansion and contraction of components within perimeter opening construction, resulting from prevailing local maximum range of ambient and surface temperatures.
   2. Base engineering calculation on actual surface temperatures of materials due to solar heat gain and night-sky heat loss.

G. U Factor of Assembly: 0.45 or lower when measured in accordance with AAMA 1503.

H. Solar Heat-Gain Coefficient: Limit whole-window SHGC, determined with the integration of the specified glass.

I. Air Infiltration: Limit air infiltration through assembly to 0.10 cu ft/min/sq ft of wall area, measured at a reference differential pressure across assembly of 1.57 psf as measured in accordance with ASTM E 283.

J. Condensation Resistance Factor: CRF of 52 when measured in accordance with AAMA 1503.1.

K. Water Leakage: None, when measured in accordance with AAMA 101.I.S.2-97 referenced test methods at a water test pressure equaling 15 percent of positive design pressure, but not less than 2.86 lbs/sq. ft. or more than 7.5 lbs/sq. ft. when tested according to AAMA/NWWDA 101/I.S.2, Water Resistance Test.

L. STC (Sound Transmission): Provide current test conducted and certified by authorized independent acoustical testing facility for compliance with **ASTM E90** for glazed window units achieving an **STC** of 30---31 with the incorporated both sealed insulated glass specified.

M. . Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly.
1. Vapor Seal: No vapor seal failure at interior static pressure of 1 inch, 72 degrees F and 40 percent relative humidity.

N. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, or migrating moisture occurring within system.

O. Deglazing: No disengagement of glazing surrounds members of operable panels when tested according to ASTM E 987 at 40 lbs on vertical rails and 30 lbs on other rails.

1.04 SUBMITTALS

A. Administrative Requirements, for submittal procedures. Submit following for review:
1. Product Data: Provide component dimensions, information on glass and glazing, internal drainage details, and descriptions of hardware and accessories.
2. Shop Drawings: Indicate opening dimensions, elevations of different types, framed opening tolerances, method for achieving air and vapor barrier seal to adjacent construction, anchorage locations, and installation requirements.
   a. Include full scale, head, jamb, meeting stile, and sill sections.
   b. Include isometric views of head and sill corners. Indicate all aspects of water barrier details required at the head and or sill to achieve water barrier levels required for the entire window assembly.
3. Color Samples: Submit for approval two samples of frame coating, showing full range of color variations.
4. Samples: Submit two samples, 12 x 12 inch in size illustrating typical corner construction, accessories, and finishes.
5. Submit two samples of operating hardware.
6. Submit current unexpired copies of AAMA 101.I.S.A-440-08 certified structural test reports.
7. Submit current unexpired copies of AAMA 1503 Thermal test report and summary.
8. Submit current unexpired copies of Sound Transmission Loss Test in accordance with ASTM 90-05.
9. Submit current unexpired copies of AAMA 1302.5 Forced Entry Testing
10. Submit current specifications of technical compliance of factory paint finish.

B. Quality Assurance/Control Submittals: Submit following for Project record. No action will be taken.
1. Calculations: Submit calculations, **ON THE LARGEST OPERABLE WINDOW IN STRICT COMPLINACE WITH ASCE-7-05 PROVING COMPLIANCE WITH THE PRODUCT CAPABILITY WITHIN THE BUILDING DESIGN PRESSURE CRITERIA. SUBMITTING INSTALLATION CONTRACTOR SHALL PROVIDE THE ANCHORING SCHEDULE WITH THE SHOP DRAWINGS, INDICATING**

ANCHOR SIZE AND SPACING. THIS SUBMITTAL MUST BE APPROVED BY THE MANUFACTURER.

2. Test Reports: Manufacturer's published reports and Independent testing agency reports must be **AAMA Certified** and demonstrate compliance with specified requirements. Include the following:
   a. Reports of Independent Testing Agency, approved by FEMS and Architect, demonstrating compliance of proposed units with specified performance requirements. Test reports shall describe window and door systems completely.
   b. Written test procedure and drawings including details of units and mounting in test chamber.
   c. Sealant compatibility reports by manufacturers of both materials including thermal break to frame corner seal, sub frame corner sealant joints to perimeter sealants, and rubber glazing components to glazing sealants.
   d. Written confirmation of manufacturer of rubber setting blocks and other rubber glazing components, certifying compatibility between rubber and silicones used in this glazing system.
   e. Durability under exterior exposure for polymeric and rubber materials.

3. Manufacturer and Installer Qualifications: Submit lists of projects documenting not less than five years of documented successful experience in fabrication and installation of high rise residential and commercial windows.
   a. For each project: List building name and address, owner's representative, general contractor, architect, and appropriate subcontractors with phone numbers and contact personnel.

4. Manufacturer's Installation Instructions: Include complete preparation, coordination and sequence of work of other trades, installation, and cleaning requirements.
   a. Installation Drawings: Describe step-by-step sequence and methods of installation, including coordination with related trades.

C. Closeout Submittals: Contract Closeout Submittals:
   1. Submit warranty. Ensure that forms have been completed in FEMS name and registered with manufacturer. Produce "Original" warranties by manufacturer for ownership to FEMS.

   2. Maintenance Manuals: Produced by manufacturer listing procedures and recommended frequency for inspecting, adjusting and maintaining windows specific to this project. Address all hardware, gaskets, and sealants and describe cleaning procedures for glass and metal surfaces.

1.05 QUALITY ASSURANCE

A. Comply with requirements of AAMA 101.I.S.A-440-08.
   1. Maintain one copy of document on site.

B. Manufacturer and Installer: Company specializing in fabrication of commercial Historic Wood Windows of types required, with not fewer than five years of experience.
   1. Check availability of all specified materials upon contract signing, and order promptly so work is not delayed. Submission of Proposal confirms that Contractor has verified that specified materials are available.

2. Installer Qualifications: All mechanics on this project shall be completely familiar with these contract documents and procedures shown on installation sequence shop drawings before installing units.

C. Testing Agency Qualifications: Manufacturers testing and or Independent testing agency, acceptable to authorities having jurisdiction, with experience and capability to conduct testing indicated, as documented according to ASTM E 548.

D. Sequence affected trades including installation of flashing and sealants to ensure continuity of air and watertight installation.

1.06 MOCK UP INSTALLATION & TEST (Owners Option)

A. Provide mock up of a combination window unit to be used within the project and conduct a field mock-up test in strict compliance with AAMA 502 method A and B. Both separate openings to be tested under "Contract" testing by a designated independent testing agency.
   1. Schedule mock up installation sufficiently in advance of need to allow adequate time for cure of sealants, testing and reconstruction, if needed, without delaying the project.
   2. Build mock up in building envelope wall in location selected by FEMS and Architect.

B. Notify FEMS and Architect at least one week before testing so that they may be represented during all testing.

C. Perform tests specified in Field Quality Control Article.
   1. FEMS will pay Architect's fees for observing successful and unsuccessful tests, and will withhold from Contractor and reduce Contract Sum an amount equal to FEMS and Architect's fees for observation of unsuccessful tests.
   2. If mock-up fails test, Contractor shall propose corrections for approval of FEMS and Architect.
   3. Modify mock up construction and perform additional tests as required to achieve specified minimum acceptable results. If corrections are not adequate, construct new mock up, at written direction of FEMS and Architect. Co-ordinate construction of mock up with other involved trades.
   4. Approved mock ups may become part of completed Work if undisturbed at time of Substantial Completion.

1.07 PRE-INSTALLATION MEETING

A. Schedule pre-installation meeting to occur immediately before or after regularly scheduled Progress Meeting.
   1. Convene one week before starting work of this section.
   2. Inspect and discuss condition of substrate and other preparatory work performed by other trades.
   3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   4. Review required testing and inspecting procedures.

1.08 DELIVERY, STORAGE, AND PROTECTION

A. Comply with requirements of AAMA CW-10.

B. Delivery: Schedule delivery to coincide with glazing schedules so that minimum handling of crates is required.
   1. Deliver products to project site and store in manufacturer's protective cartons until openings are ready for window and door installation. Do not open crates except as required for inspection for shipping damage.
   2. Inspect frames for damage, including finish damage and fracture of thermal breaks or frame corner seals.

C. Storage: Store cases according to printed instruction on case, in areas least subject to traffic or falling objects. Provide space around frames and keep storage area clean, dry and well-ventilated to avoid condensation and other moisture-induced damage to frame finish.

D. Handling: Unpack cases following printed instructions on case. Stack individual units on edge leaned slightly against upright supports with separators between each.

1.09 PROJECT CONDITIONS

A. Environmental Requirements:
   1. Do not install sealants when ambient temperature is less than 40 degrees F.
      a. Maintain this minimum temperature during and 24 hours after installation of sealants.

B. Existing Conditions: Field verify openings by field measurements before fabrication, and indicate measurements on Shop Drawings.
   1. Established Dimensions: Where field measurements cannot be made without delaying Work, establish opening dimensions and proceed with fabricating Historic Wood Windows without field measurements. Coordinate wall construction to ensure actual opening dimensions correspond to established dimensions.

1.10 WARRANTY

A. Provide with submittals and Field and File submittals manufacturers warranty for materials and manufactured workmanship for a period of (5) five years from substantial completion. Warranty must convey ownership to FEMS.
   1. Correct defective Work within a five year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Historic Wood Window Manufacturers:

   1. Basis of design is Norwood Windows 500 & 800.
   2. Alternate manufacturers submitting will be required to meet the performance specified inclusive of all aspects and features.

B. All Historic Wood Windows must be provided by sole source manufacturer capable of providing all types of the Historic Wood Windows.

C. All Historic Wood Windows **must be pre-approved** by the ***District of Columbia Historic Preservation Office.***

2.02 WINDOWS

A. Windows: All profiled wood sections, factory fabricated, factory finished, vision glass, infill panels, related flashings, and anchorage and attachment devices.

B. Fixed, Non-Operable Type:
   1. Performance Requirements: AAMA 101/I.S.2 DP-40.
   2. Fixed windows shall be operable units equal in appearance to operable units with manufacturer's applied stops.
   3. Construction: Wood Profiled
   4. Glazing: Double; Clear Low "E", PPG Solarban 70 XL clear insulated.

C. Double Hung Window Type:
   1. Performance Requirements: AAMA 101/I.S.2 DP-40.
   2. Double Hung windows shall be operable units equal in appearance to operable units with manufacturer's applied stops.
   3. Construction: Wood Profiled
   4. Glazing: Double; Clear Low "E", PPG Solarban 70 XL clear insulated.

2.03 COMPONENTS

A. Frames: Profile as indicated, wood sections matching profiles of existing.
   1. Frame Corner Fasteners: 18-8, AISI Type 302 stainless steel machine screws.
   2. Attachment Accessories: As detailed and required for attachment to wall structure at head, jamb and sill.

B. Insect Screen Frame: Interior flat screens on projected and casement windows and exterior flat screens on double hung windows shall be fabricated with extruded aluminum frame of rectangular sections; fit with adjustable hardware; nominal size similar to operable glazed unit.
   1. Provide for each operable exterior sash or ventilator.
   2. Design windows and hardware to accommodate screens in a tight-fitting, removable arrangement, with a minimum of exposed fasteners and latches. Fit screen within window frame, allowing clear access to operating hardware without requiring removal or opening of screen or wickets.
   3. Insect Screens: 14/18 mesh, aluminum mesh.

C. Operable Sash Weather-stripping: Nylon pile; permanently resilient, profiled to achieve effective weather seal.

D. Replica Sweep locks and keepers @ Double Hung Windows. Replica handle and hardware for projected and casements.

E. Replica true divided and or simulated muntins required for approval. NOTE: Patterns must be replica.

D. Fasteners: Stainless steel.

E. Sealant and Backing Materials: All sealants shall be structural silicone with compatible primers.

2.04 MATERIALS

A. Replica treated wood window components as required for assembly and approval for application required by the preservation requirements. All components must be treated with required preservative to maintain required warranty period.

B. Concealed Steel Items: Profiled to suit mullion sections; galvanized in accordance with ASTM A 123/A 123M to 2.0 oz/sq ft. as needed. NOTE: All steel inserts must be concealed.

C. Fastener materials: AISI Type 302 stainless steel.
   1. Fasteners for Structural Angle to Window frame to wall construction: Pan Head slotted machine screws, with split ring lock and flat washers and hex nuts, size as required, minimum 5/16 inch diameter.

D. Plastic Components: Resist QUV exposure with UV-B 313 bulbs, 4 hour CON at 50° C/4 hour UV at 40°C, in accordance with ASTM G53 for 2000 hours without embrittlement, cracking, or fading, and shall have a verifiable 5 year successful field track record.
   1. Recommended for exterior use by plastics manufacturer.

E. Sealants: Compatible with perimeter joint caulking. Seals with double-faced tape not allowed.
   1. Frame Corner Sealant: Compatible with contiguous sealants.

2.05 HARDWARE

A. General: Provide manufacturer's standard hardware fabricated from stainless steel complying with AAMA 907, or other corrosion-resistant material compatible with aluminum; designed to smoothly operate, tightly close, and securely lock Historic Wood Windows and sized to accommodate sash or ventilator weight and dimensions. Do not use aluminum in frictional contact with other metals.
   1. Sweep Lock & Keeper shall be restoration white
   2. Pulls: Manufacturer's standard type.
   3. Tilt Latch shall be white
   4. Provide truth roto operators on projected and casement.

2.06 FABRICATION

A. Fabricate components with smallest possible clearances and shim spacing around perimeter of assembly that will enable window installation and dynamic movement of perimeter seal.
   1. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
   2. Prepare components to receive anchor devices.
   3. Arrange fasteners and attachments to ensure concealment from view.
   4. Prepare components with internal reinforcement for operating hardware.
   5. Provide steel internal reinforcement in mullions as required to meet loading requirements.

B. Provide internal drainage of glazing spaces to exterior through weep holes.
   1. Construct and install sub-frame/receptor system and window so that any joints or overlaps

in the system are not against the flow of water.

2. Base of Weeps in Vertical Surfaces: Minimum 1-1/2 inches long and flush with intersecting horizontal surface to avoid ponding water.
3. Slope horizontal bar in transom and horizontal mullion/muntin members down to exterior and weep.
4. Weep framing at window heads to drain any water that may accumulate.
5. Weep each sash (operable and fixed) glazing pocket and sill frame. Locate all weeps at lowest drainage point of section to drain all water from section. At each sash, provide three weep holes/slots (beyond and between setting blocks) of minimum cross-section dimension of 3/8 inch.

C. Perimeter Seals: Provide outer head and jamb perimeter seals, as well as a through-sill flashing (if detailed).
   1. Do not penetrate or interrupt continuity of perimeter seals.

D. Frame Perimeter Anchorage: Arrange for frame attachment to structural substrate as required to meet Performance Requirements. Do not anchor through or to finishes.
   1. Design anchorage to building structure such that failure of any single anchor will not make anchorage system unstable or cause working loads to exceed 50% of ultimate static anchorage capacity.
   2. Design anchorage system so that fasteners shall be concealed and not visible after installation.
   3. Perimeter anchors or brackets shall not penetrate sealant joints.
   4. Do not penetrate horizontal leg of sill with sill anchors. Penetrating rear, upturned leg 1-1/2 inch or higher above horizontal leg is allowed. Mechanically anchor sill using either continuous or discrete anchor clips with intermediate stiffening to create compression air seal between flashing and spaced not to exceed 12 inches o.c.
   5. Provide interior and exterior replica wood trim as shown on *Informational Take Off* as required to conceal flashing and anchors.

E. Assemble insect screen frames with mitered and reinforced corners. Secure wire mesh tautly in frame. Fit frame with spring loaded steel pin retainers and or spring tension springs.

F. Double weather-strip operable units.
   1. Install weather-stripping continuously around opening and butt together tightly at corners. Discontinuities in backing retainer grooves at intersections shall not exceed 1/8 inch.
   2. Mechanically secure weather-stripping to prevent slippage when operating sash and to prevent other displacement.
   3. Provide single line of weather-stripping along inboard face of operable sash at sill, placed approximately, 1/4 inch below top edge of inboard vertical leg of sill track.
   4. Weather-stripping: Replaceable without disassembly of sash or unit frame or removal of unit frame from opening.

G. Match components to ensure continuity of line.

2.07 FINISHES

A. Finish all exposed areas of Historic Wood Windows and components with electrolytically deposited color, 3 coat Kynar Paint, 2605 compliant. Color will be **Custom Color to Match Existing**

B. Apply 1 coat of bituminous coating or install PVC shim separations to concealed fastener and steel surfaces in contact with dissimilar materials.

2.08 GLASS & GLAZING INSTALLATION

A. Conform to latest edition of glazing standards of GANA GM - Glass Association of North America Glazing Manual and GANA SM - Glass Association of North America Sealant Manual.
   1. Install glass in fixed and operating units in accordance with manufacturer's recommendations.
   2. Allow all rubber gaskets to relax and recover several hours prior to installation. All gaskets shall be oversized 1% to 2% in length. Install gaskets at ends and center and then fit in remaining portions. Butt corner joints tightly and seal. Avoid contaminating surfaces to be sealed with any lubricating solutions. Provide 6 to 8 lb/in pressure on gaskets.
   3. Do not permit edges of insulated glass to contact any solvents.
   4. Do not allow glass to touch framing system; replace chipped or scratched glass.
   5. Keep glazing rabbet clean and dry during installation of glass.
   6. Install outboard glazing tape to provide continuous support to glass.
   7. Place setting blocks at quarter points of sill member without blocking any weep holes.
   8. Set glass centered in opening to allow at least 1/8 inch clearance between sides of glass and anti-walk pads, and to provide at least 1/2 inch bite on glass by glazing stops.

B. Exterior Glazing Joints: Wet seal fixed and operable sash with recessed sealant bead at least 1/8 inch deep and 1/8 inch wide. Provide sufficient clearance at operable sash to allow removal from inside for reglazing.
   1. Verify that exterior tape is recessed uniform 1/8 inch from face of exterior bead. Clean all surfaces to receive sealant.

   2. Use primer if recommended by sealant manufacturer. Allow primer to dry.

C. **Sealed Insulated Glass:** Sealed insulated glass in all operable sashes shall be 9/16" overall. Glazing shall be sealed insulated glass with 1/8" exterior 2nd surface Low "E" PPG Solarban 70XL and interior glass shall be 1/8" clear annealed. The overall units must render a SHGC of .27, SC of .32 and a U of .27. Tempered glazing will be required on the hinged glass door.

D. **All glazing in bath rooms will require pattern 62 Obscure Glazing (OBS)**

E. All sealed insulated glass units shall meet the requirements of ASTM E 774 specification, Class "A". Sealed insulated glass units shall be warranted against seal failure for a period of (10) ten years from date of manufacturing.

2.09 SOURCE QUALITY CONTROL

A. Fabrication Tolerances:
   1. Maximum offset of frame or sash component, including glazing stops, from plane of adjacent section: 1/32 inch.
   2. Maximum metal-to-metal joint separations: 1/32 inch; positively and continuously seal exterior joints to prevent water penetration into frame.

3. Maximum difference in corner-to-corner diagonal dimension on frames: 1/8 inch.
4. Application of sealant to face of joints (face-sealing) is prohibited.

PART 3 EXECUTION

3.01 EXAMINATION

A. Existing Conditions: Examine openings for Historic Wood Windows to ensure that they are proper size plumb, square and level before installation of frames is started.
   1. Verify that adjoining air and vapor seal materials are ready to receive Historic Wood Windows.

B. Immediately before placing into opening, inspect frames for any damage, including finish damage and fracture of thermal breaks or frame corner seals.

3.02 PREPARATION

A. Clean down exterior caulking at perimeter of main frames and masonry: Completed prior to installation of window unit assemblies.

B. Coat aluminum in direct contact with concrete, masonry, steel, or other non-compatible material with bituminous paint, zinc rich primer, or other suitable insulating material.

3.03 INSTALLATION

A. Securely install windows and doors in accordance with AAMA 101, manufacturer's instructions and accepted shop drawings.
   1. Shim frames to perimeter opening to accommodate construction tolerances and other irregularities.
   2. Install sill shims at three points to support to sill track. Use wedge shim directly over sill. Set wedge and uniform thickness shims into bed of sealant.
   3. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.
   4. Maintain relation to established lines and grades indicated on approved shop drawings.

B. Use anchorage devices to securely fasten unit assemblies to wall construction without distortion or imposed stresses. **See 2.06, D and E.**
   1. Use approved means of frame anchorage to allow for thermal expansion and contraction of frames.
   2. Do not penetrate horizontal portion of active weep areas of unit frame with fasteners. Install frames without use of exterior exposed fasteners.

C. Provide thermal isolation where components penetrate or disrupt building insulation. Pack closed cell backer rod insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

D. Coordinate attachment and seal of perimeter air barrier and vapor retarder materials.

E. Install operating hardware not pre-installed by manufacturer.

F. Install perimeter sealant in accordance with requirements specified herein.

G. Install perimeter trim and interior closures.

3.04 ERECTION TOLERANCES

A. Comply with following tolerances:
   1. Maximum Variation from Level or Plumb: 1/16 inches every 3 ft non-cumulative or 1/8 inches per 10 ft, whichever is less?
   2. Maximum Longitudinal or Diagonal Warp: Plus or minus 1/8 inch from 10 foot straight edge.

3.05 ADJUSTING AND CLEANING

A. Adjust hardware for smooth operation and secure weather tight closure.

B. Cleaning:
   1. Remove protective material from factory finished aluminum surfaces.
   2. Wash surfaces by method recommended and acceptable to sealant and window manufacturer; rinse and wipe surfaces clean.
   3. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant and window manufacturer.

END OF SECTION